

**U. S. DEPARTMENT OF ENERGY  
WORK BREAKDOWN STRUCTURE DICTIONARY  
PART II - ELEMENT DEFINITION**

<b>1. PROJECT TITLE/PARTICIPANT</b> Environmental Management/Paducah Remediation Services, LLC (PRS)		<b>2. DATE</b> 06/29/07	<b>3. IDENTIFICATION SITE</b> Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
<b>4. WBS ELEMENT CODE</b> 04.11.01.06		<b>5. WBS ELEMENT TITLE</b> Pump-and-Treat Operations	
<b>6. INDEX LINE NO.</b> N/A	<b>7. REVISION NO. AND AUTHORIZATION</b> Rev 0		<b>8. DATE</b> 06/29/07
<b>9. APPROVED CHANGES</b> N/A			
<b>10. SYSTEM DESIGN DESCRIPTION</b> N/A		<b>11. BUDGET AND REPORTING NUMBER</b> N/A	
<b>12. ELEMENT TASK DESCRIPTION</b>  <b><u>WBS STRUCTURE</u></b>  The scope of this element includes the following subelements: <ul style="list-style-type: none"> <li>• WBS 04.11.01.06.01 Plumes - Subproject Management</li> <li>• WBS 04.11.01.06.02 Plumes - O&amp;M</li> <li>• WBS 04.11.01.06.03 Plumes - Unscheduled Maintenance</li> <li>• WBS 04.11.01.06.04 Plumes - Waste Disposal</li> <li>• WBS 04.11.01.06.05 Plumes - Well Rehabilitation</li> </ul> <b><u>INTRODUCTION</u></b>  The Northwest (NW) and Northeast (NE) Plumes both contain trichloroethene (TCE). The NW Plume contains technetium-99 (Tc-99) contaminants. Additionally, Tc-99 recently has been detected in the NE Plume; this detection is considered a changed condition. Interim remedial actions were developed to mitigate and retard the spread of the highest contaminant concentrations of each plume. To implement these interim actions, two pump-and-treat facilities have been installed. The NW Interim Record of Decision (ROD) was signed in 1993, and the NE Interim ROD was signed in 1995. It is anticipated that the pump-and-treat systems, at a minimum, will remain in operation until a final dissolved-phase plume remedy (WBS 04.11.01.02) is implemented.			
<b><u>LOGIC RELATIONSHIPS</u></b>  <b>Interfaces:</b> <u>Internal to PRS</u> <ul style="list-style-type: none"> <li>• All PRS project managers and staff</li> <li>• All subcontractors</li> </ul> <u>External to PRS</u> <ul style="list-style-type: none"> <li>• U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office (PPPO) and support contractors</li> <li>• DOE Headquarters or other DOE sites (if applicable)</li> <li>• U.S. Environmental Protection Agency (EPA)</li> <li>• Commonwealth of Kentucky (KY)</li> <li>• Site tenants including United States Enrichment Corporation (USEC); Uranium Disposition Services, LLC; and Swift &amp; Staley Team (SST)</li> <li>• USEC services in the area of property, information technology, radios, etc.</li> <li>• SST, particularly in the areas of property management, information technology, and security.</li> </ul>			

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- Nevada Test Site (NTS): Profiling and disposition of newly generated and classified and fissile low-level waste (LLW), if required or applicable.
- EnergySolutions: Profiling, treatment, and disposition of mixed and LLW, if required or applicable.
- Toxic Substances Control Act (TSCA) Incinerator, if required or applicable.
- Commercial treatment, storage, and disposal facility (TSDF): For treatment and disposal of nonradioactive hazardous waste, if required or applicable.
- Stakeholders
- Citizens Advisory Board and supporting contractor Edward Holmes, Inc. (EHI).
- DOE Integrated Safety Management System (ISMS) Verification Team
- Other nonregulatory key interfaces

**Time Sequencing with Other Work:**

It is anticipated that the pump-and-treat systems will be operating continuously through fiscal year 2009. The operation of the systems will not require sequencing with other activities, although operational data in this WBS will be provided to Environmental Management for inclusion in the semiannual FFA Report. The Environmental Monitoring group samples the monitoring wells associated with the two systems and Kentucky Pollutant Discharge Elimination System (KPDES) Outfall 001. Personnel from this program will interface with personnel operating the systems to ensure there are no conflicts. Labor costs associated with disposing future-generated treatment system consumables (e.g., ion exchange resin and activated carbon) and with sample collection are included in this WBS element.

**SCOPE DESCRIPTION**

**WBS 04.11.01.06.01 Plumes - Subproject Management**

Provide overall management activities associated with this subproject. Activities performed under this subelement include the following:

- Perform technical, contractual, and project functions necessary to effectively manage and report scope, schedule, and budget.
- Maintain all activities within the defined safety, environmental, and quality requirements.
- Perform technical and personnel management functions.
- Maintain technically qualified and properly trained personnel.
- Develop, evaluate, and report project performance metrics.
- Interface with DOE, KY, EPA, other prime contractors, and stakeholders, as needed.

The method(s) used for determining earned value for this WBS element is Level of Effort.

**WBS 04.11.01.06.02 Plumes - O&M**

Operate the two existing groundwater pump-and-treat facilities at Paducah Gaseous Diffusion Plant (PGDP)—the NW Plume Groundwater System (NWPGS) and the NE Plume Containment System (NEPCS). Operation of the facilities represents an Interim Remedial Action (IRA) consistent with the ROD for the Northwest Plume (reference: DOE/OR/06-1143&D4, July 1993) and Northeast Plume (reference: DOE/OR/06-1356&D2, June 1995). The purpose of the IRA is to recover and treat contaminated groundwater to control the highly concentrated cores of the respective plumes until regulatory approval is obtained to cease operations. The NWPGS consists of four groundwater extraction wells. Groundwater is treated by air stripping and ion exchange. Off-gas from the air stripper is treated by vapor phase carbon. Operation of the facility will be consistent with the approved Operations and Maintenance (O&M) Plan (NWPGS Plan, DOE/OR/07-1253&D4). The NEPCS consists of two extraction wells and treatment by air stripping. Operation of the facility will be consistent with the approved O&M Plan (NEPCS Plan, DOE/OR/07-1535&D3). Generally, the

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routine O&M consists of the following:

- Monitoring operations;
- Collecting operational and analytical data;
- Maintaining operating procedures and plans;
- Submittal of the monthly water withdrawal report;
- Replacement of spent filter carbon;
- Routine and preventative maintenance described in the Maintenance, Calibration, and Testing Plan;
- Extraction well inspections; and
- Replacement of spent ion exchange resin.

The method(s) used for determining earned value for this WBS element is Level of Effort.

**WBS 04.11.01.06.03 Plumes - Unscheduled Maintenance**

- Repair and replace system and facility components that fail prematurely.
- Decontamination & demolition of the C-612-A Clamshell structure

The method(s) used for determining earned value for this WBS element is Level of Effort.

**WBS 04.11.01.06.04 Plumes - Waste Disposition**

Proper disposition of waste generated as a result of pump-and-treat operations including these:

- Spent filter carbon,
- Spent ion exchange resin,
- Used personnel protection equipment,
- Spent lubricants (oil, etc.), and
- Other operational debris such as sample bottles and used parts.

The method(s) used for determining earned value for this WBS element is Percent Complete.

**WBS 04.11.01.06.05 Extraction Well Rehabilitation**

Biofouling occurs in the NWPGS and NEPCS extraction wells. The biofouling occurs in the screened interval and eventually could negatively impact operations. The pump-and-treat systems are designed for a certain range of groundwater production if groundwater production drops below these levels (180 gpm at the NWPGS or 100 gpm at the NEPCS), and then mechanical and/or chemical rehabilitation will be required. Based on biofouling, rehabilitation, and well performance history, two well rehabilitations (2 well bores) have been forecasted for the period between April 2006 and October 2009.

The method(s) used for determining earned value for this WBS element is Percent Complete.

**DELIVERABLES**

**WBS 04.11.01.06.01 Plumes - Subproject Management**

Element Milestones

- None

Element Deliverables

- Paducah PRS Quality Assurance Project Plan
- Paducah PRS Environmental, Safety & Health Plan

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<ul style="list-style-type: none"><li>• Provide input to the following reports and submittals (if applicable):<ul style="list-style-type: none"><li>○ Monthly Project Performance Report (PPR)</li><li>○ Risk Management Plan Updates</li><li>○ Site Management Plan (SMP)</li><li>○ Solid Waste Management Unit Assessment (SWMU) Report</li><li>○ Semiannual Critical Analysis Report</li><li>○ Presentations</li><li>○ Federal Facility Agreement (FFA) briefings</li><li>○ Labor determinations</li><li>○ Gold Chart Performance Metrics</li><li>○ Annual updates to Site Treatment Plan</li><li>○ Annual Compliance Agreement Report</li><li>○ Annual ISMS Update</li><li>○ Annual Work Smart Standards Update</li><li>○ Financial Reporting, Management Analysis Reporting System</li><li>○ Annual Statement of Costs Incurred and Claimed</li><li>○ FFA Semiannual Progress Report</li><li>○ Remedial Action/Regulatory Commitment Tracking Report</li><li>○ Other reports/documents, as necessary</li></ul></li></ul>		
<b>WBS 04.11.01.06.02 Plumes – O&amp;M</b> <u>Element Milestones</u> <ul style="list-style-type: none"><li>• Six carbon replacement events</li><li>• Submittal of 42 Monthly Water Withdrawal Reports</li></ul> <u>Element Deliverables</u> <ul style="list-style-type: none"><li>• Modifications to the O&amp;M Plans will be prepared on an as-needed basis. Any changes to operation parameters or the system configuration will be made as needed.</li><li>• Monthly water withdrawal reports for the NWPGS will be submitted electronically to the Division of Water using the Division’s Radius software.</li></ul>		
<b>WBS 04.11.01.06.03 Plumes – Unscheduled Maintenance</b> <u>Element Milestones</u> <ul style="list-style-type: none"><li>• None</li></ul> <u>Element Deliverables</u> <ul style="list-style-type: none"><li>• None</li></ul>		
<b>WBS 04.11.01.06.04 Plumes - Waste Disposition</b> <u>Element Milestones</u> <ul style="list-style-type: none"><li>• Receipt of resin at disposal facility.</li></ul> <u>Element Deliverables</u> <ul style="list-style-type: none"><li>• Documentation of receipt and/or disposal of the waste from the treatment, storage, disposal, or recycling (TSDR) facility.</li></ul>		
<b>WBS 04.11.01.06.05 Extraction Well Rehabilitation</b> <u>Element Milestones</u> <ul style="list-style-type: none"><li>• Resumption of extraction rates equal to or greater than 100 gpm at the NEPCS and 180 gpm at the NWPGS.</li></ul>		

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Element Deliverables

- Water Withdrawal Report

**REQUIREMENTS**

- Comprehensive Environmental Response, Compensation, and Liability Act/National Contingency Plan
- KY Hazardous Waste Permit (KY8-890-008-982)
- FFA for the PGDP
- SMP for PGDP (annual revisions)
- Applicable state and federal laws and regulations (applicable or relevant and appropriate requirements)
- PRS ISMS
- UEO-1066, as updated, Lease Agreement between DOE and USEC, Revision 4, dated October 30, 2001
- Enclosure to GDP 95-0018, as updated, USEC and DOE Resolution of Shared Site Issues, Revision 1, dated March 30, 1998
- Applicable PRS plans, policies, and procedures
- Waste acceptance criteria for all applicable treatment and disposal facilities that were in effect on April 24, 2006.
- Applicable DOE Orders
- Applicable Federal Acquisition Regulations

It is the core value of PRS that the safety and health of every worker, the public at large, and our environment are the most important assets that we are entrusted to protect. To accomplish this, an ISMS, based on DOE's ISMS, has been implemented that incorporates the five core functions and is based on the seven guiding principles. The objective of ISMS is to systematically integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses Nuclear Safety, Industrial Safety, Industrial Hygiene, Occupational Health, Health Physics, and environmental issues. ISMS requirements flowdown to PRS subcontractors. The five core functions are (1) define the scope of work, (2) analyze hazards, (3) develop and implement hazard controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The seven guiding principles are (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibility, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard control tailored to work being performed, and (7) operations authorization.

Before a subproject begins, several activities must be completed that demonstrate that all involved in the project have completed rigorous health and safety reviews and that all potential hazards of doing the work have been identified. The routine activities in remedial actions are conducted in accordance with standard operating procedures, activity hazard analyses, and Integrated Safety Management plans. Nonroutine work will require a readiness assessment, as necessary, to ensure complete health, safety, and environmental reviews prior to work start. This assessment is conducted by people experienced in similar kinds of work with the right to examine all aspects of a project about to commence and requires that the project team provide documented evidence that any applicable requirements of the job have been met.

**SCOPE ASSUMPTIONS**

- Tc-99 detected in the NE Plume is considered a changed condition; it is assumed the detection of

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<p>Tc-99 does not necessitate the permanent shutdown of the NEPCS, modifications to the treatment systems, a change in the O&amp;M Plan or procedures, additional reporting requirements, or increased monitoring or analysis.</p> <ul style="list-style-type: none"><li>• The NEPCS and the NWPGS will remain in operation for the duration of the base contract period.</li><li>• Disposition of waste related to NEPCS and the NWPGS operations that was generated prior to April 24, 2006, is included in the Legacy Waste Baseline 04.12.01.01.</li><li>• Procurement and contract management are in Project Support Baseline.</li><li>• No new extraction wells will be installed; existing extraction wells will not be abandoned.</li><li>• Sampling and analytical requirements will not increase.</li><li>• Biofouling in extraction wells that does not reduce extraction rates below 100 gpm and 180 gpm for at the NEPCS and NWPGS, respectively, will not necessitate well rehabilitation.</li></ul>		
<b><u>COMPLETION CRITERIA</u></b>		
<b>WBS 04.11.01.06.01 Plumes - Subproject Management</b> <ul style="list-style-type: none"><li>• Completion of technical and reporting requirements.</li></ul>		
<b>WBS 04.11.01.05.02 Plumes – O&amp;M</b> <ul style="list-style-type: none"><li>• Operate and maintain the NWPGS and NEPCS in accordance with the approved O&amp;M Plans through 9/30/09.</li></ul>		
<b>WBS 04.11.01.06.03 Plumes - Unscheduled Maintenance</b> <ul style="list-style-type: none"><li>• Unscheduled repairs will be made in a timely manner so that each system (NWPGS and NEPCS) will be operational a minimum of 85% of each calendar quarter. The following will not be included in operational time calculations:<ul style="list-style-type: none"><li>1) downtime due to weather-related system failures between 6:00 a.m. and 6 p.m.</li><li>2) production time for replacement parts that are not available upon order.</li></ul></li></ul>		
<b>WBS 04.11.01.05.04 Plumes - Waste Disposition</b> <ul style="list-style-type: none"><li>• Obtain documentation of waste receipt and/or disposal from TSDF or the on-site landfill.</li></ul>		
<b>WBS 04.11.01.06.05 Extraction Well Rehabilitation</b> <ul style="list-style-type: none"><li>• Resumption of extraction rates of 180 gpm for the NWPGS and 100 gpm for the NEPCS.</li></ul>		
<b><u>RISK MANAGEMENT</u></b>		
<p>See Risk Management Plan for analysis.</p>		
<p>Risk was mitigated through the following efforts:</p> <ul style="list-style-type: none"><li>• Continue to perform due diligence in all work activities to reduce the possibility of safety incidents.</li><li>• Perform due diligence to ensure that waste is properly packaged and that transportation conveyances are properly loaded.</li><li>• Follow waste characterization, packaging, transportation, and disposition procedures and plans.</li><li>• Ensure that documents are written professionally and accurately.</li><li>• Ensure that fieldwork is carried out safely and in accordance with work instructions.</li><li>• DQOs will have qualitative and quantitative statements derived from the DQO Process that clarify study objectives, define the appropriate type of data, and specify the tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions and process knowledge.</li></ul>		

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<ul style="list-style-type: none"> <li>• Ensure QA/QC procedures address potential system and equipment failures.</li> <li>• Subcontractor will follow ALARA principles and approved decontamination procedures.</li> </ul> <p><b><u>CERCLA AREAS AND SWMU</u></b></p> <p>None</p> <p><b><u>BASIS OF ESTIMATE</u></b></p> <p><b>1. Summary of Site Conditions</b>  The NWPGS and the NEPCS currently are operational facilities. It is anticipated the two pump-and-treat facilities will continue to operate at least through fiscal year 2009. Tc-99 recently was detected in the NE Plume; operations at the NEPCS were suspended temporarily at the request of USEC. The system was restarted, but USEC has requested that DOE propose an operational limit for Tc-99.</p> <p><b>2. Estimating Methods</b>  <input type="checkbox"/> Parametric    <input type="checkbox"/> Bottoms-Up    <input checked="" type="checkbox"/> Other: <u>Both Parametric and Bottoms-Up</u></p> <p><b>3. Sources of Estimating</b>  Labor – Project team meetings were utilized to review the current estimate and identify staff types to be used for activities associated with this effort.</p> <p>Materials – Materials for unscheduled maintenance and O&amp;M was based on the past history of the project. Cost for resin and carbon changes was based on previous experience.</p> <p>Other Direct Cost – Same as materials.</p> <p>Transportation – N/A.</p> <p>Subcontracts – Experience from technical staff provided requirements for the involvement of subcontracts and, where appropriate, subcontract unit rates (contract rates) were used.</p> <p><b>4. Basis of Estimate (Unescalated Values)</b></p> <p><b>WASTE VOLUMES</b></p> <p>See attached waste performance metrics, as applicable.</p> <p><b>PROJECT SCHEDULE</b></p> <p>See attached schedule.</p> <p><b>BASELINE BY YEAR</b></p> <p>See attached Baseline by Year Report.</p>		